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AN EARLY PLEISTOCENE FAUNA FROM NEBRASKA

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A lower Pleistocene deposit[3] containing fossil vertebrates was discovered in 1936, four miles east and one mile north of Broadwater, in NE1/2 of sec. 20 and NW1/4 of sec. 21, T. 19 N., R. 47 W., Morrill County, Nebraska. This new locality is on land owned by Mr. Dan J. Boman and Mrs. Mary A. Boman of Broadwater, and was reported to the writers by Messrs. S. R. Sweet and T. C. Middleswart of Bridgeport. Four quarries were opened during 1936.

The fossilized remains were found in a white, sandy, argillaceous, diatomaceous earth, and also in lenses of fine, bog-iron stained sand. The bones are light chocolate-brown in color and are often crushed, warped and bent. Sands and gravels occur both below and above the fossil-bearing horizon. These deposits belong to the "upper terrace" of the north side of the North Platte Valley. The fossil-bearing stratum extends some forty miles to the east and several miles to the west.

The character of the deposits at the various quarry sites, together with the fauna, suggests the former presence of swamps. Imprints of fossil reed-like plants occur frequently in the diatomaceous layer and remains of a number of aquatic animals have been found in the quarries. Among the latter are otter, beaver-like rodents, muskrat, and also fishes and frogs.

Twenty-eight mammals are represented. The horse is most abundant. The absence of mammoth, bison and musk-oxen is noted, but the writers believe these forms to be later migrants into that section during the Pleistocene.

The geology, and also the fauna, indicate that the quarries are of lower Pleistocene age, possibly Aftonian. Fossils have already been attributed to the "Aftonian" from Nebraska and near-by localities, but it is very doubtful if many of these specimens are actually of Aftonian age. See chart (Fig. 1) for suggested stratigraphic relationship of the

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[3] Barbour, Erwin H., and Schultz, C. Bertrand, 1936, p. 450.

fauna of the Broadwater Quarries and other known faunas from the Nebraska Region.

The American Museum of Natural History and the Frick collections from Hay Springs have aided much in a better understanding of the middle Pleistocene fauna of Nebraska. Until recently very little has been known about the lower Pleistocene. In 1934, the Frick expedition, under the leadership of Morris F. Skinner, opened a new fossil quarry[1] of

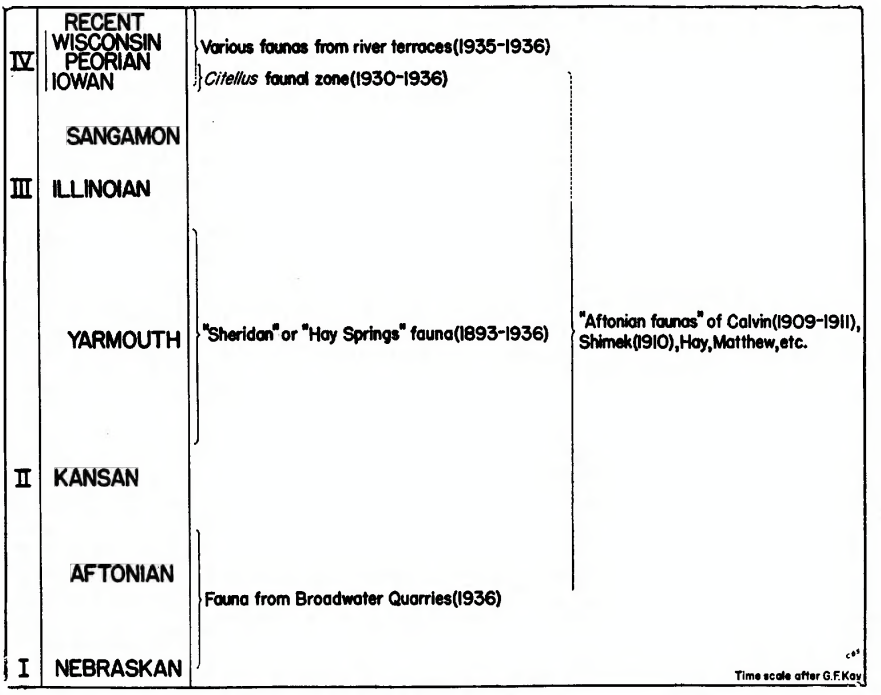

Fig. 1. Chart showing approximate stratigraphic position of fauna from Broadwater Quarries in relation to other known Pleistocene faunas from Nebraka.

lower Pleistocene age in Brown County, Nebraska. In this peat and diatomaceous earth bed were found the remains of a number of stegomastodonts (*Stegomastodon primitivus* Osborn) and a few bones of other Pleistocene mammals. The fauna of the Broadwater Quarries adds to the list of known lower Pleistocene forms and it is hoped that future work in this locality will contribute much more information.

[1] Osborn, Henry Fairfield, 1936, pp. 726–728.

The field work at Broadwater was carried on under the direction of the junior writer for the Nebraska State Museum. Members of the parties who collected at the quarries include Messrs. S. R. Sweet, T. C. Middleswart, W. F. Chaloupka, and John Ochoa of Bridgeport, and Messrs. Thompson M. Stout, E. L. Blue, Frank Crabill, Gordon Graham, David Abbott, Jack Graham, Dean Kerl, and Mrs. Marian Schultz of the Nebraska State Museum expedition, and Mr. Fred Schall of Princeton University.

The writers are deeply grateful to Mr. Childs Frick and Dr. Walter Granger of The American Museum of Natural History and Dr. C. Lewis Gazin of the National Museum for helpful suggestions and allowing the examination of specimens. Mr. Thompson M. Stout has liberally co-operated with the writers in the study of the rodents from the quarries. The drawings for figures 2 to 4 were made by Mr. Ralph Mefferd.

LIST OF MAMMALS FROM BROADWATER AND HAY SPRINGS QUARRIES

Broadwater[1] (lower Pleistocene)	Hay Springs[2] (middle Pleistocene)
INSECTIVORA	
Sorex sp.	
EDENTATA	
Mylodon sp.	*Mylodon garmani* Allen
	Mylodon nebrascensis (Brown)
	Megalonyx leidyi Lindahl
LAGOMORPHA	
Lepus sp.	
Sylvilagus sp.	
RODENTIA	
Sciurid	
	Cynomys niobrarius Hay
Geomys sp.	*Geomys* sp.
Thomomys?	*Thomomys* sp.
Procastoroides sweeti, new genus and species	
	Castoroides ohioensis nebraskensis Barbour
	Castor sp.

[1] A preliminary list.
[2] Matthew, W. D., 1918, pp. 226–229.
Frick, Childs, 1930, pp. 70–80; 1937, pp. 199–202, 521–537
Schultz, C. Bertrand, 1934, pp. 357–393.

Broadwater (lower Pleistocene)	Hay Springs (middle Pleistocene)
Dipoides?	
Peromyscus sp. [near *P. maniculatus* (Wagner)]	
Ondatra sp.	*Ondatra nebrascensis* (Hollister)
Mimomys?	
Microtinid indet.	
	Microtus?
Zapus sp. [near *Z. hudsonius* (Zimmerman)]	
Neotoma?	
CARNIVORA	
Canis sp. (near *C. latrans* Say)	*Canis latrans?* Say
Canis sp. [near *Canis* (*Aenocyon*) *dirus* Leidy]	*Canis* (*Aenocyon*) *dirus nebrascensis* Frick
	Arctodus simus nebrascensis Frick
Satherium piscinaria middleswarti, new variety	
	Mustela vision? Schreber
Felis?	
	Smilodon nebrascensis Matthew
PROBOSCIDEA	
Stegomastodon mirificus primitivus Osborn	
	Archidiskodon imperator (Leidy)
PERISSODACTYLA	
Equus sp. (near *E. excelsus* Leidy)	*Equus excelsus* Leidy
	Equus excelsus niobrarensis Hay
Equus sp. (more primitive species)	
Equid (very light-limbed form; known only from a single metapodial)	
	Equus calabatus nebrascensis Frick
ARTIODACTYLA	
	Platygonus vetus Leidy
Camelops sp. (much larger form than *C. kansanus* Leidy)	*Camelops kansanus* Leidy
	Camelops vitakerianus? (Cope)
Tanupolama sp. [much larger form than *Tanupolama americanus* (Wortman)]	*Tanupolama americanus* (Wortman)
Camelid, possibly *Titanotylopus nebraskensis* Barbour and Schultz	

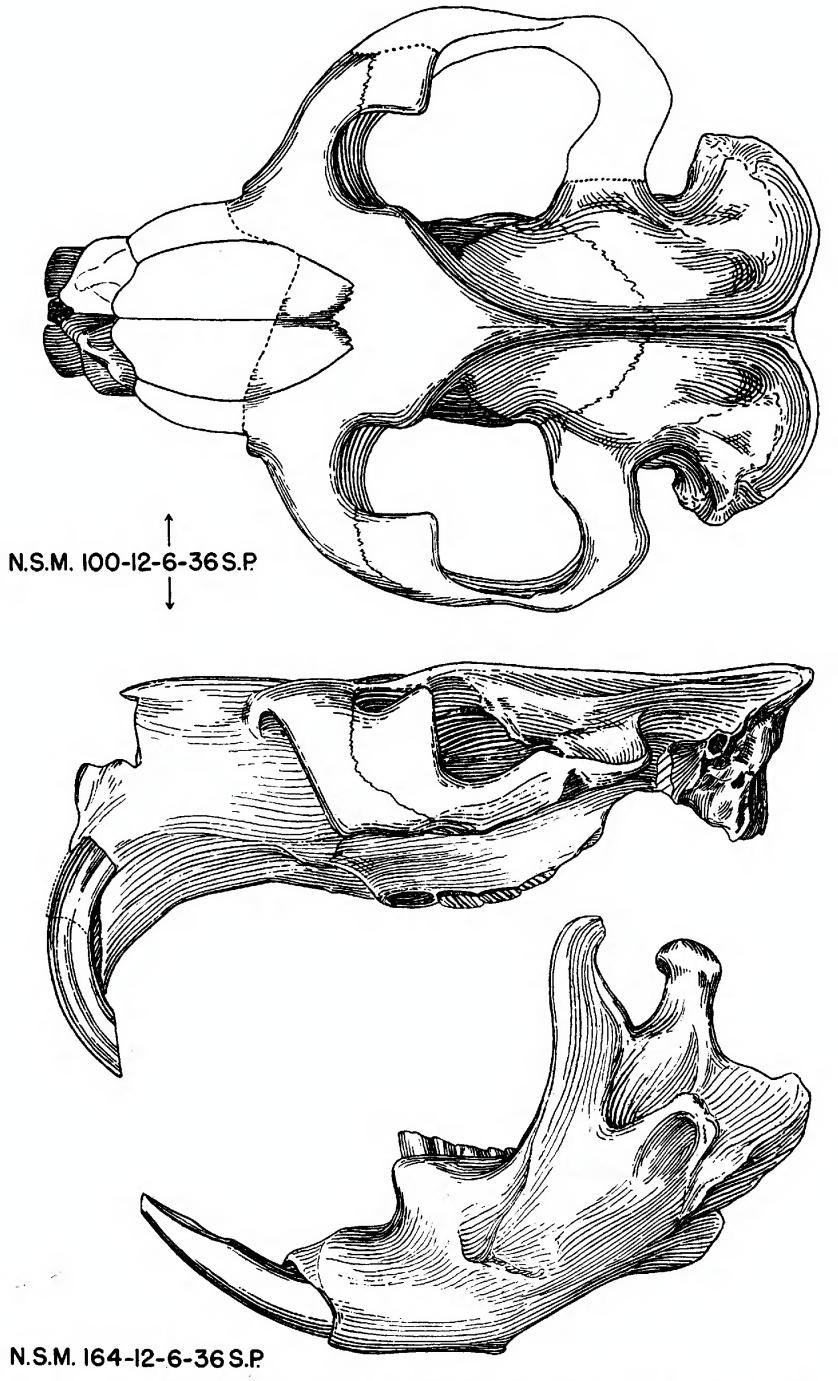

Fig. 2. *Procastoroides sweeti.* Type. N.S.M. 100–12–6–36S.P., skull, top and right side; N.S.M. 164–12–6–36S.P., ramus, right side. One-half natural size.

Broadwater (lower Pleistocene)	Hay Springs (middle Pleistocene)
	Odocoileus sheridanus Frick
Capromeryx sp. (larger form than *C. furcifer* Matthew)	*Capromeryx furcifer* Matthew
Antilocaprid, probably *Tetrameryx*	*Tetrameryx* (*Hayoceros*) *falkenbachi* Frick
	Bovid

The collection from the Broadwater Quarries also contains the following unidentified vertebrates:

PISCES
Various forms
AMPHIBIA
A very large collection of frog material
REPTILIA
Turtle, perhaps two forms
Snake, at least one form
AVES
Various forms

DESCRIPTION OF NEW MATERIAL

CASTOROIDIDAE

Procastoroides sweeti, new genus and species

TYPE.—Nebr. State Mus. Nos. 100-12-6-36S.P., skull, and 164-12-6-36S.P., left ramus.

REFERRED.—4 skull fragments, 7 rami, 33 molars and premolars, 20 incisors and incisor fragments, 2 scapulae, 4 humeri, 5 ulnae, 2 partial radii, 5 portions of pelvi, 2 femora, 1 tibia, 3 astragali, 4 misc. foot bones, 1 distal phalanx, and misc. ribs and vertebrae from the Broadwater Quarries.

LOCALITY.—Broadwater Quarry 3, NW$^1/_4$ of sec. 21, T. 19 N., R. 47 W., Morrill County, Nebraska.

HORIZON.—Lower Pleistocene, (?)Aftonian.

GENERIC AND SPECIFIC CHARACTERS.—Form and proportions very beaver-like, approaching those of *Castoroides;* approximately three-fourths of the size of *Castoroides;* incisors without longitudinal grooves but cheek-tooth pattern as in *Castoroides;* skull brachycephalic and more flattened than that of *Castoroides;* width of rear of skull less than one-half its length while in *Castoroides,* rear of skull much wider proportionately; narrowest part of brain-case at the middle of length of skull and just behind orbits as in *Castoroides;* limb elements like *Castoroides.*

DISCUSSION.—The size variation of the referred specimens is great. Upper incisors vary from 8 mm. wide in immature specimens to as much as 15 mm. in old individuals. Perhaps when more material is secured it may be determined that the largest forms represent another variety or species.

Fig. 3. *Procastoroides sweeti.* Type. N.S.M. 100–12–6–36S.P., upper right dentition, reversed; N.S.M. 164–12–6–36S.P., lower left dentition. Natural size.

Thanks are due to Professor William Berryman Scott for suggestions concerning the description of this material.

Measurements of type skull and ramus of *Procastoroides sweeti*, N.S.M. 100– and 164–12–6–36S.P.

	mm.
Length (max., including supraoccipital crest and incisors)	200.
Basal length	167.
Condylo-basal length	177.
Width (max., across zygomatic arches)	145.
Length of dental series (P^4–M^3) on triturating	43.5
Length of P^4	12.5
Width of P^4	10.5
Length of M^1	10.
Width of M^1	10.
Length of M^2	10.
Width of M^2	9.
Length of M^3	11.5
Width of M^3	8.
Max. width of incisor	11.5
Length (max., including incisors, measured parallel to grinding surface of premolar-molar series)	170.
Length from posterior of condyle to tip of incisor	156.
Depth of jaw below anterior of P_4	46.
Length of dental series (P_4–M_3) on triturating surface	49.
Length of P_4	15.
Width of P_4	10.5
Length of M_1	13.
Width of M_1	10.
Length of M_2	12.
Width of M_2	10.5

Length of M_3	10.
Width of M_3	9.
Max. width of incisor	11.5

MUSTELIDAE

Satherium piscinaria middleswarti, new variety

TYPE.—Nebr. State Mus. Nos. 250–12–6–36S.P., incomplete skull, and 251–12–6–36S.P., right ramus.

LOCALITY.—Broadwater Quarry 3, NW1/4 of sec. 21, T. 19 N., R. 47 W., Morrill County, Nebraska.

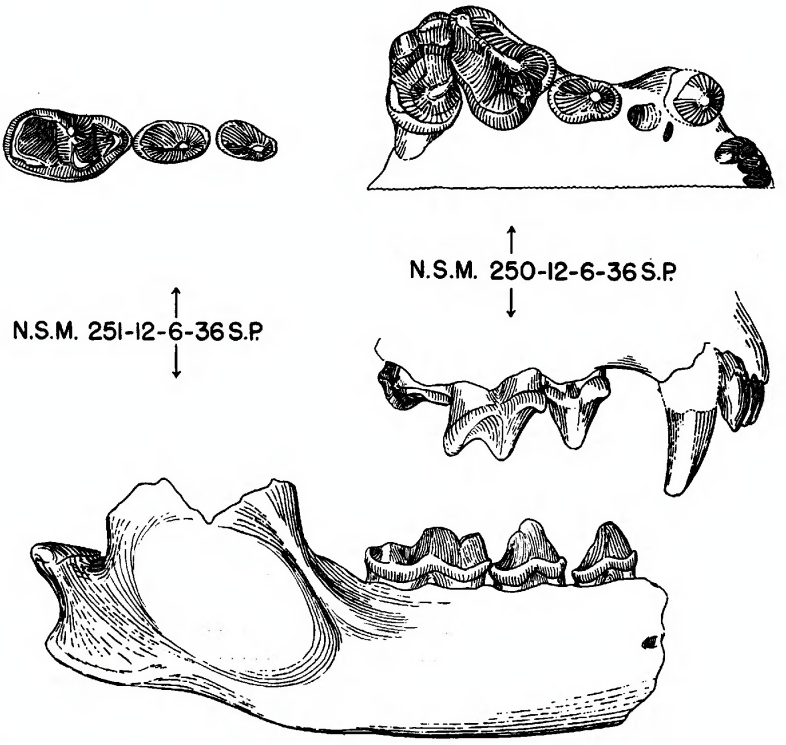

Fig. 4. *Satherium piscinaria middleswarti*. Type. N.S.M. 250–12–6–36S.P., crown and side views of right upper dentition; N.S.M. 251–12–6–36S.P., right ramus and crown view of right lower dentition. Natural size.

HORIZON.—Lower Pleistocene, (?)Aftonian.

DIAGNOSIS.—Very close to *Satherium piscinaria* from Hagerman, Idaho, but slightly larger; lower teeth similar to those of the Hagerman species but carnassial heavier, especially posteriorly; upper carnassial from Hagerman with a much more definite anterior cusp.

Measurements of type skull and ramus of *Satherium piscinaria middleswarti*, N.S.M. 250– and 251–12–6–36S.P.

	mm.
Width of skull between orbits	28.
Length of dental series (C–M^1)	43.5
Length of premolar series	32.
Length of P^3	9.3
Width of P^3	6.1
Length of P^4	15.5
Width of P^4	11.5
Length of M^1	9.5
Transverse diameter of M^1	15.
Width across upper incisors	16.
Length of ramus from posterior of condyle to anterior of P_3	72.5
Depth of jaw below anterior of M_1	18.5
Length of P_3–M_1	35.
Length of P_3	8.5
Width of P_3	5.2
Length of P_4	10.
Width of P_4	6.2
Length of M_1	17.
Width of M_1	9.3

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